

**9-23 CONCRETE CURING MATERIALS AND ADMIXTURES****9-23.1 Sheet Materials for Curing Concrete**

Sheet materials for curing concrete shall meet the requirements of AASHTO M 171, Sheet Materials for Curing Concrete, except that only white reflective type shall be used.

**9-23.2 Liquid Membrane-Forming Concrete Curing Compounds**

Liquid membrane-forming compounds for curing concrete shall conform to the requirements of AASHTO M 148 (ASTM C 309) Type 1D or 2, Class A or B, except that the moisture loss when tested in accordance with WSDOT Test Method 814 shall be 2.50 grams for all applications.

Each lot of liquid membrane-forming curing compound shall be sampled at the project site and tested for acceptance. Liquid membrane-forming curing compound shall not be used in the absence of satisfactory test results.

**9-23.3 Vacant****9-23.4 Vacant****9-23.5 Burlap Cloth**

Burlap cloth shall meet the requirements of AASHTO M 182, Class 4.

**9-23.6 Admixture for Concrete**

Admixtures for use in concrete shall meet the following specifications:

Admixture	Specification	
Air-entraining	AASHTO M 154	ASTM C 260
Water Reducing	AASHTO M 194 Type A	ASTM C 494 Type A
Set Retarding	AASHTO M 194 Type B	ASTM C 494 Type B
* Accelerating	AASHTO M 194 Type C	ASTM C 494 Type C
Water Reducing/ Set Retarding	AASHTO M 194 Type D	ASTM C 494 Type D
* Water Reducing/ Accelerating High Range	AASHTO M 194 Type E	ASTM C 494 Type E
Water Reducing	AASHTO M 194 Type F and G	ASTM C 494 Type F and G

\* Accelerating admixtures are only allowed for use in the following applications: In Controlled Density Fill (also known as Controlled Low Strength Material) in accordance with Section 2-09.3(1)E Backfilling, in Portland Cement Concrete Pavement in accordance with Section 5-05, and in Section 5-05.3(1) Concrete Mix Design for Paving.

In addition to the above specifications, admixtures proposed for use shall contain less than one percent chloride ion (Cl-) by weight of admixture and only non-chloride accelerating admixtures shall be used.

Acceptance of admixtures will be based on Manufacturer's Certificate of Compliance.

If required by the Engineer, admixtures shall be sampled and tested before they are used.

Samples shall be submitted for testing 10 days prior to use.

**9-23.7 Air Entraining and Chemical Admixtures for Precast Prestressed Concrete**

Air entraining admixture shall meet the requirements of AASHTO M 154. Acceptance will be on the basis of a Manufacturer's Certification of Compliance.

If required by the Engineer, the air entraining admixture shall be sampled and tested by the Materials Laboratory before use.

Chemical admixtures shall conform to the requirements of AASHTO M 194, Type A, B, D, or F. Approval of specific admixture products shall be required as a part of the annual approval of prestressed fabricators. Chloride ion content of chemical admixtures shall not exceed one percent by weight.

Acceptance will be on the basis of a Manufacturer's Certification of Compliance.

If required by the Engineer, the admixture shall be sampled and tested by the Materials Laboratory before use.

**9-23.8 Waterproofing**

Concrete made with waterproofing admixtures shall have a percent absorption after immersion and boiling of less than 5.0 percent at seven days and a volume of permeable voids less than 11.0 percent at seven days per ASTM C 642. The Contractor shall submit evidence in the form of test results showing compliance with these specifications, when they submit their concrete mix design.

If the concrete requires air entrainment, the Contractor shall also submit evidence to the Engineer that the admixture will not adversely effect the air void system of the hardened concrete. Test results complying with ASTM C 457 shall be provided as evidence to satisfy this requirement.

**9-23.9 Fly Ash**

Fly ash shall conform to the requirements of AASHTO M 295 Class C or F including optional chemical requirements as set forth in Table 2 and with a further limitation that the loss on ignition shall be a maximum of 1.5 percent.

**9-23.10 Ground Granulated Blast Furnace Slag**

Ground granulated blast furnace slag shall meet the requirements of AASHTO M 302, Grade 100 or Grade 120. The grade of the ground granulated blast furnace slag, the source, and type of manufacturing facility shall be certified on the cement mill test certificate.

**9-23.11 Microsilica Fume**

Microsilica Fume shall conform to the requirements of AASHTO M 307. The optional physical requirement for Reactivity with Cement Alkalies set forth in Table 3 will be required when Microsilica Fume is being used as an ASR mitigation measure.